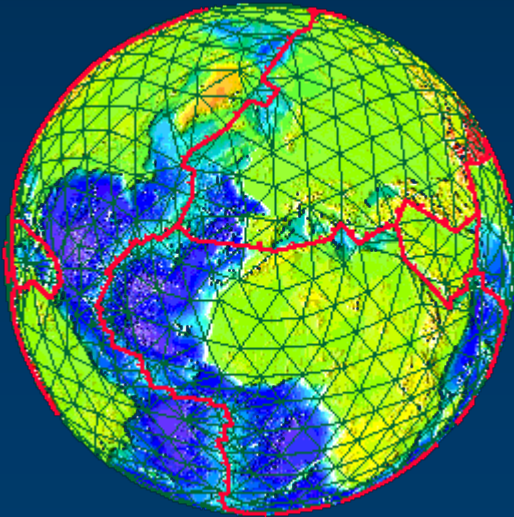




Using ArcGIS for Statewide Geosciences Applications

*Visualizing, Managing, and Analyzing Spatial Data
Related to Geological Hazards and Resources*



Mike Chenevey
Geology Symposium 2007
May 10 • Sacramento



GIS Background



“Geographic Information Systems,” in the digital sense, have been around for over 50 years

ESRI, largest GIS software company in the world, was founded in 1969 by Jack & Laura Dangermond

Today we have over 1 Million users worldwide

GIS Background

An enormous range of GIS users exist:

Banking and finance

Large retailers

Media & press

Real estate

Defense

Education

Engineering

Government

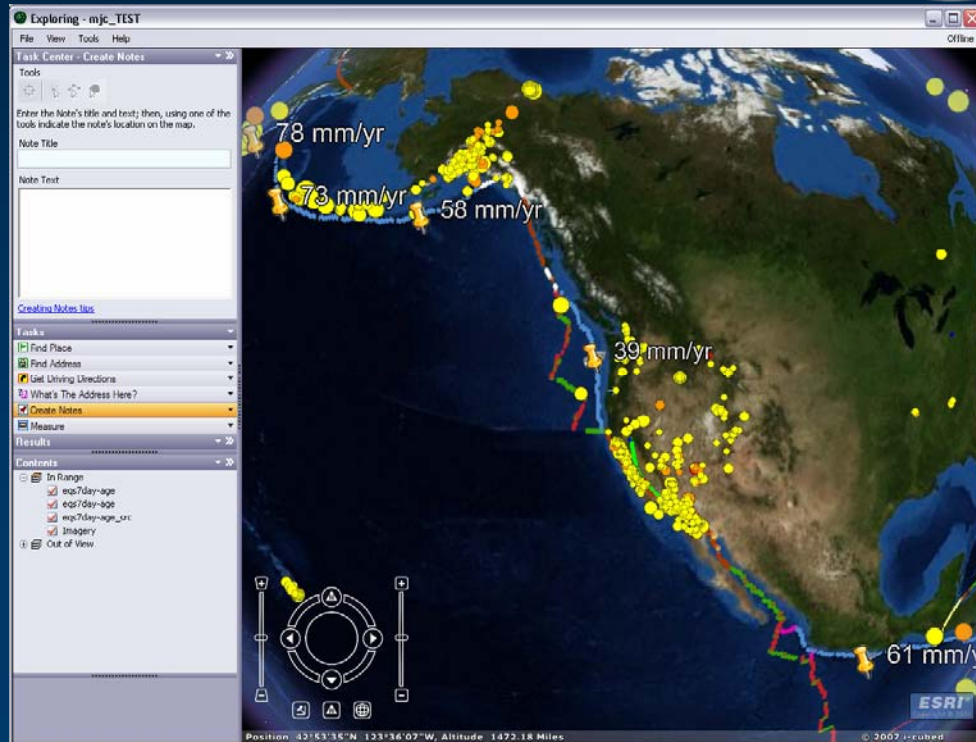
Transportation

Utilities

Natural resources

How is a GIS used?

- Visualization
- Analysis
- Spatial data management



Uses of Spatial Data - Geology

1. Locate and analyze data related to geologic hazards:

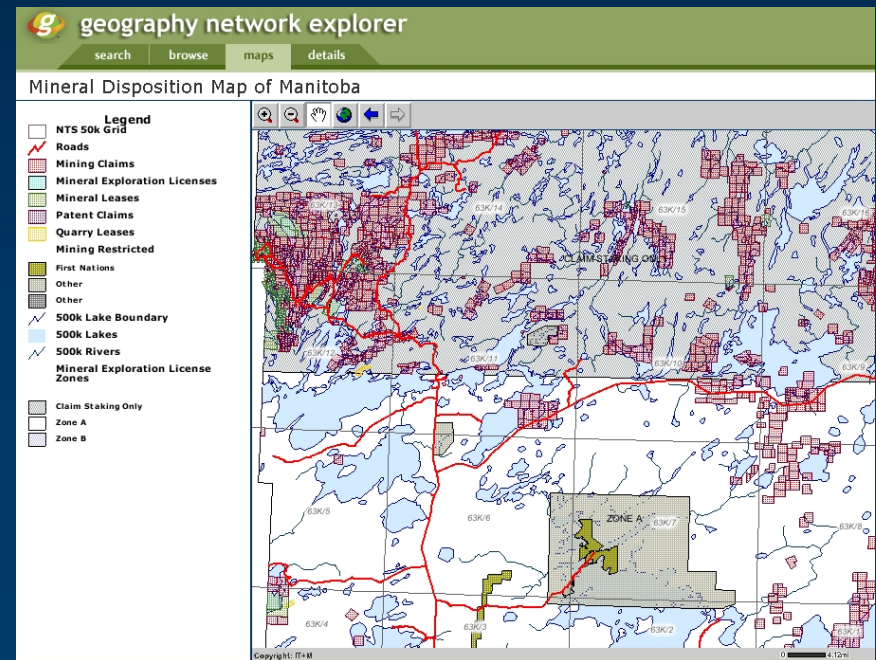
- Fault structures
- Slope hazards
- Areas of environmental protection



Uses of Spatial Data - Geology

2. Locate and analyze geologic resources:

- Rock and mineral occurrences
- Areas of mining activity (both historical and current)



Uses of Spatial Data - Geology

3. Collaborate with:

- Other agencies (local, state, federal)
- Professional consultants
- Private persons

Involves: data sharing, quality control,
and promotion of knowledge transfer

Purpose of Spatial Data Visualization, Analysis, Management

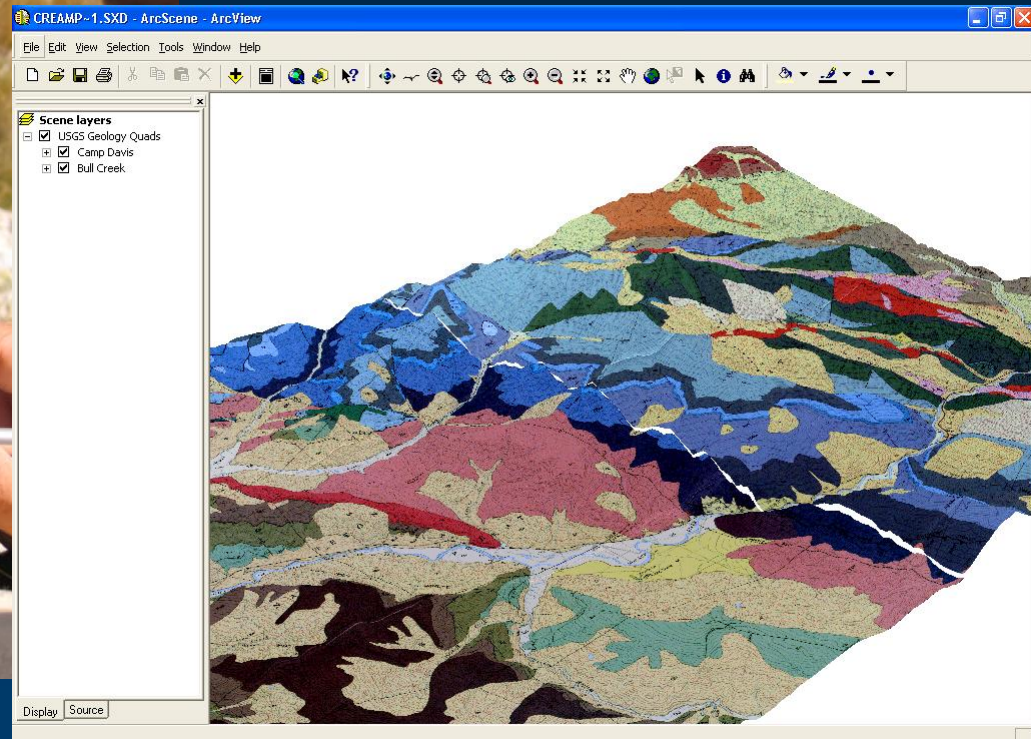
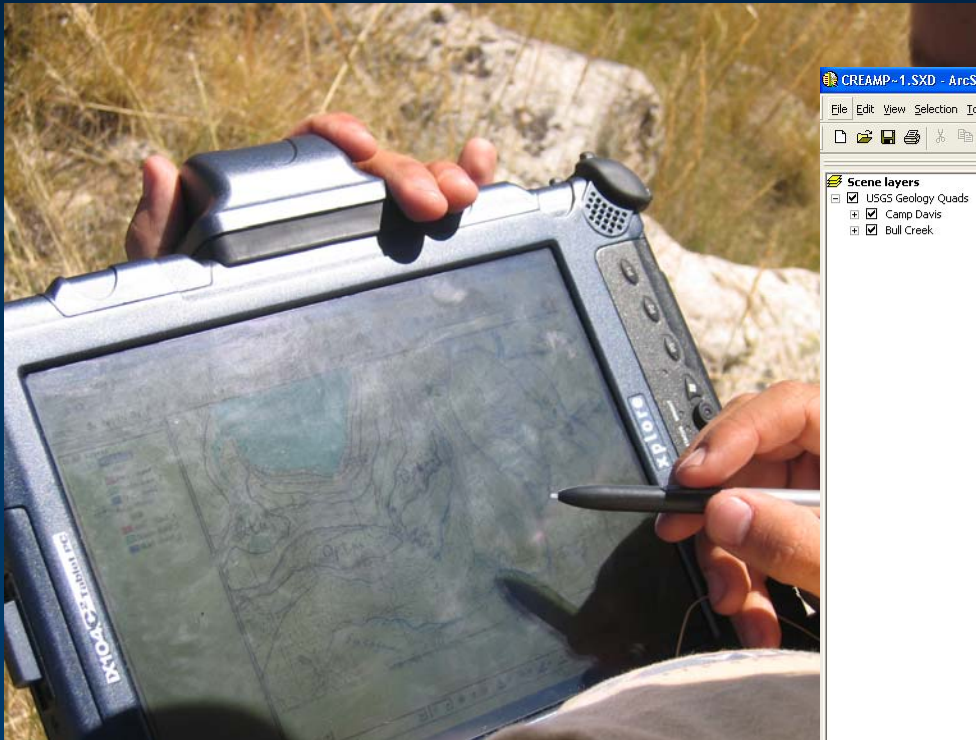
Improve the quality of decision-making:

- Health and safety
- Economy
- Business decisions

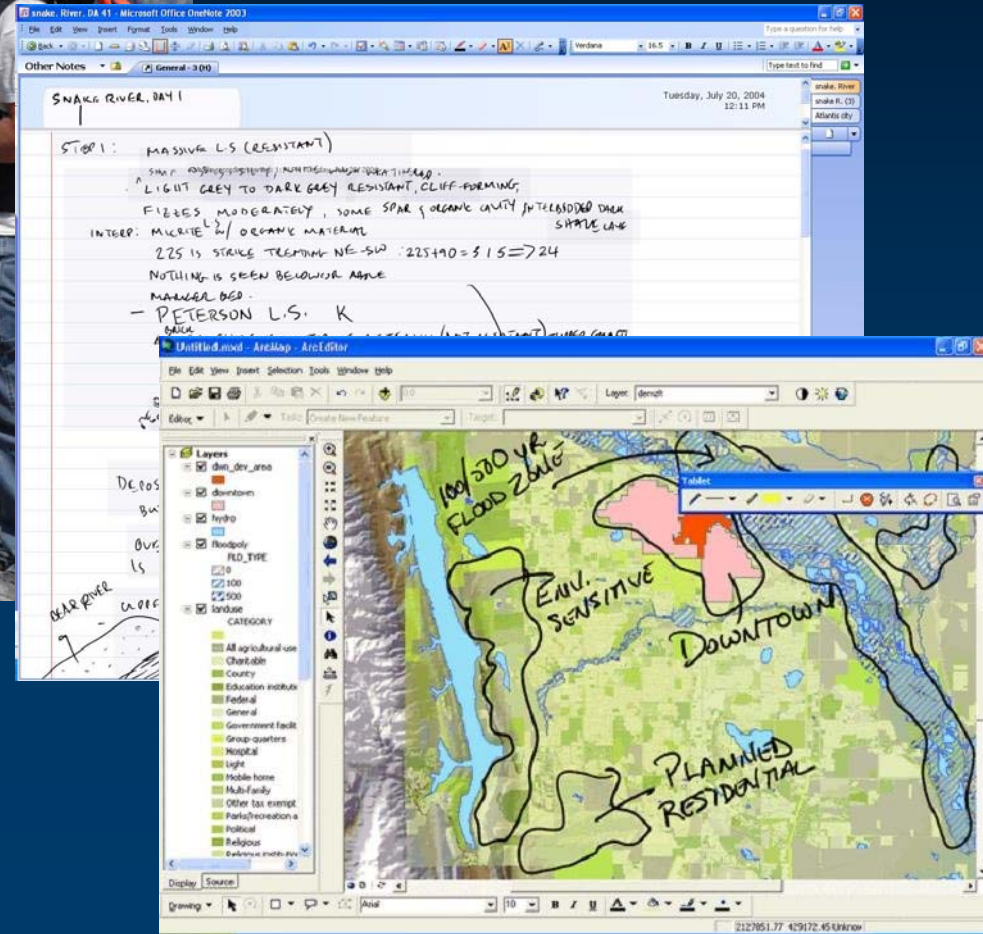
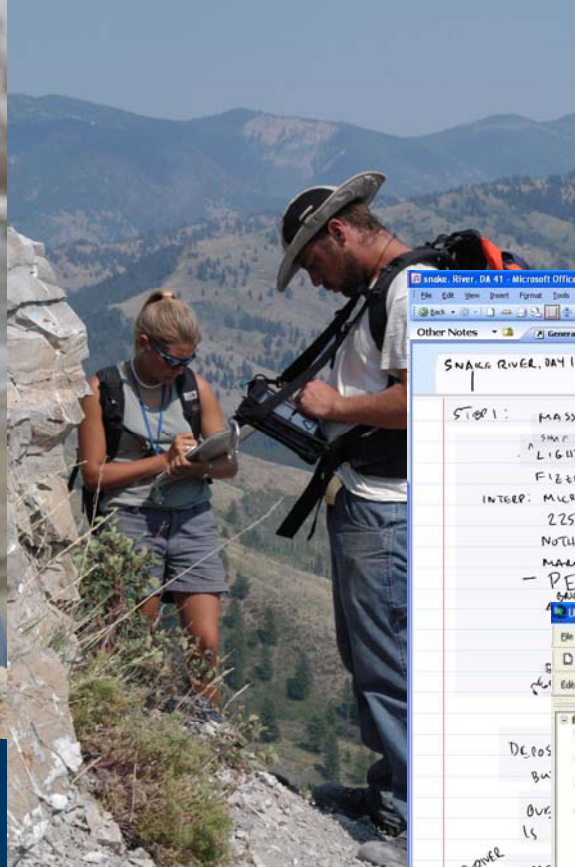


Functions Accomplished with ArcGIS

ArcGIS can be used as an end-to-end solution for locating, collecting, storing, analyzing, and visualizing geologic data

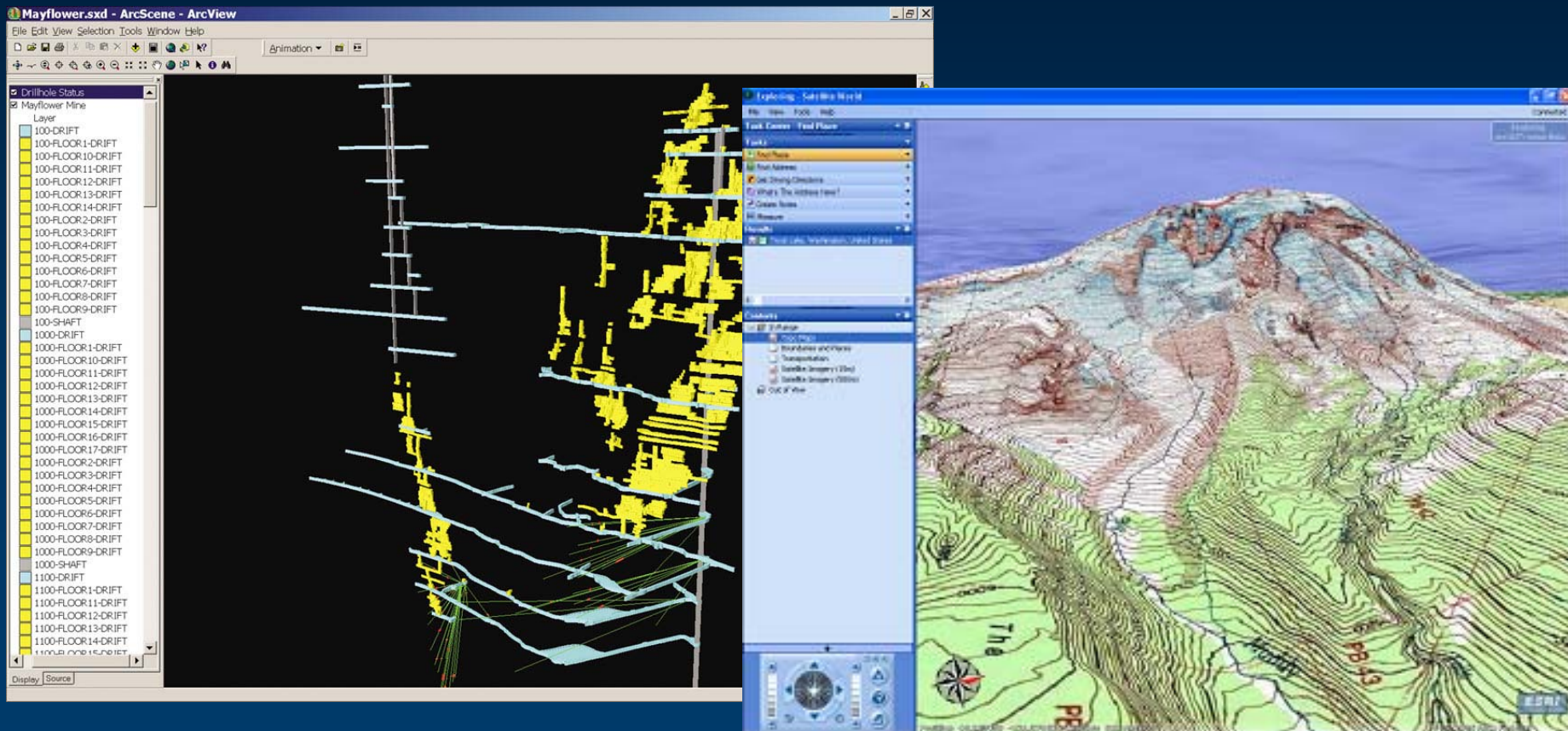


Field Data Collection



Back-in-Office Tasks

ArcGIS desktop-based software provides powerful tools for managing, analyzing, and visualizing complex geologic data



Data Input Ability

- Manual or automated digitizing
- Load data directly from AutoCAD, Microstation
- Directly load tables or spreadsheets
- Insert digital images, attributes

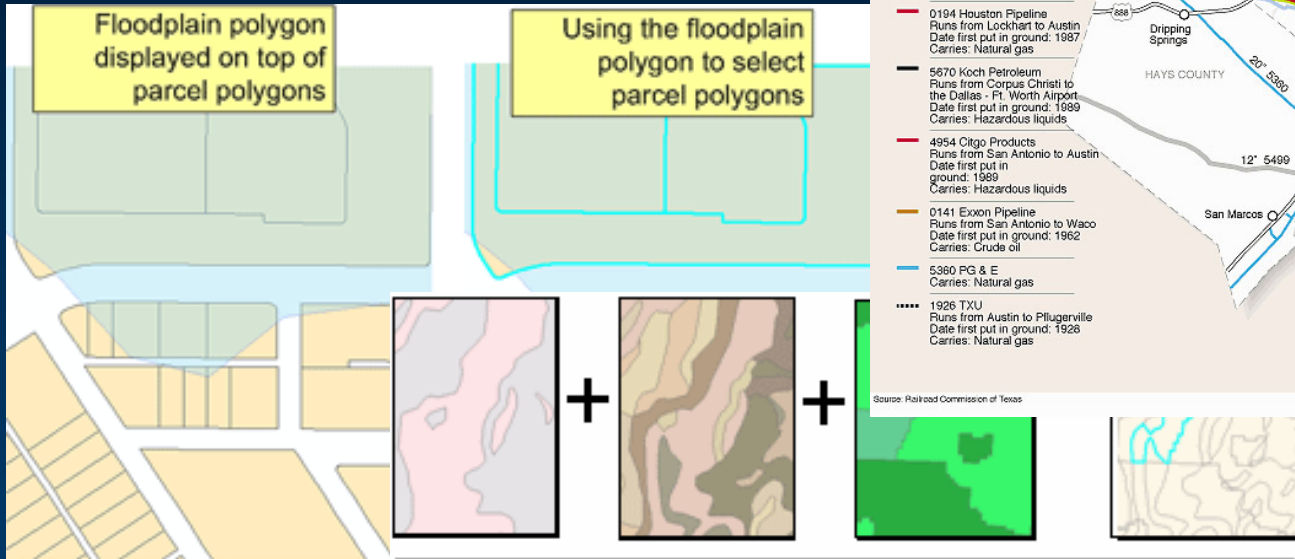
The screenshot displays the ESRI ArcMap interface with several windows open. The 'RasterToVector.mxd' window shows a map with a 'Vectorization Settings' dialog box open, displaying options like 'Intersection Solution', 'Maximum Line Width', 'Compression Threshold', 'Smoothing Weight', and 'Gap Closure Tolerance'. The 'Port of Portland CAD Drawing.mxd' window shows a map with a 'Layers' panel on the left. The 'Microsoft Excel - waypoints.xls' window is open, showing a table with columns for Index, Lat, and Lon. The table contains 16 rows of data, with the 12th row highlighted in orange.

	A	B	C	D	E	F
1	Index	Lat	Lon			
2	0	40.56711	-122.35468			
3	1	40.56711	-122.35468			
4	2	40.56711	-122.35468			
5	3	40.56711	-122.35468			
6	4	40.56711	-122.35468			
7	5	40.56711	-122.35468			
8	6	40.57251	-122.365733			
9	7	38.6924	-121.567298			
10	8	38.702341	-121.567569			
11	9	38.878933	-120.065652			
12	10	39.240723	-94.62518			
13	11	40.486764	-121.507126			
14	12	39.7348	-121.83055			
15	13	37.762756	-122.437134			
16	14	39.755283	-121.813383			

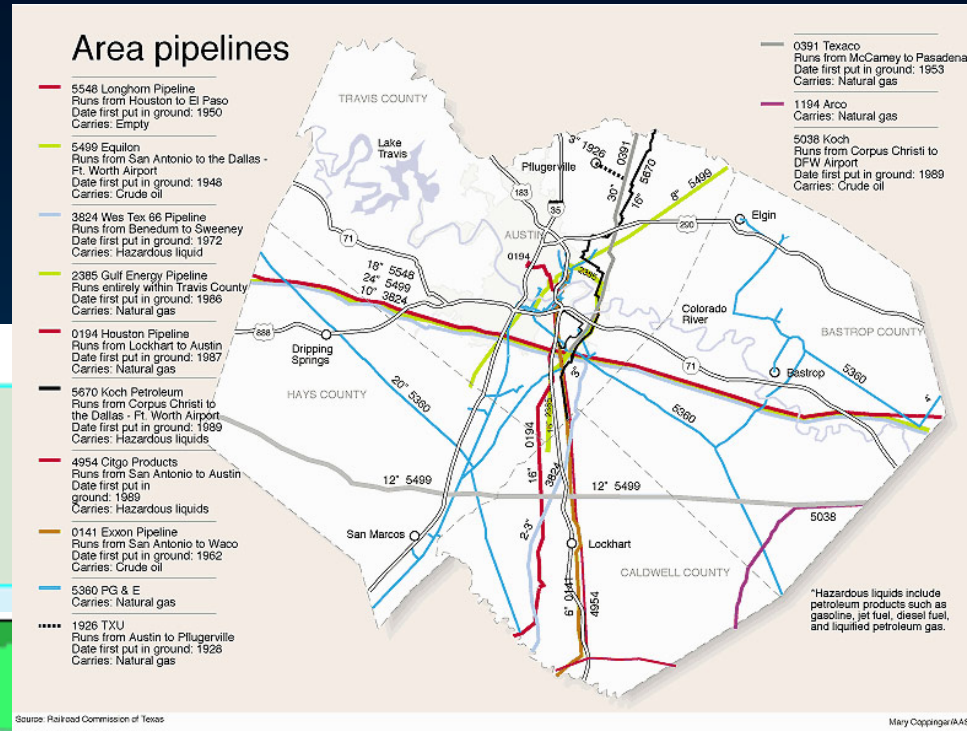


Spatial Analysis

- Overlay analysis
- Proximity analysis



	FID	Shape*	FID_soils	CODE	CLASS	FID_sl	SLOPE	FID_veg	DET_TYPE
	3039	Polygon	508	38F	6	0	60	117	A
	3040	Polygon	508	38F	6	0	60	119	SS
	3041	Polygon	508	38F	6	0	60	157	U
	3042	Polygon	508	38F	6	0	60	158	A
	3043	Polygon	508	38F	6	0	60	160	FC



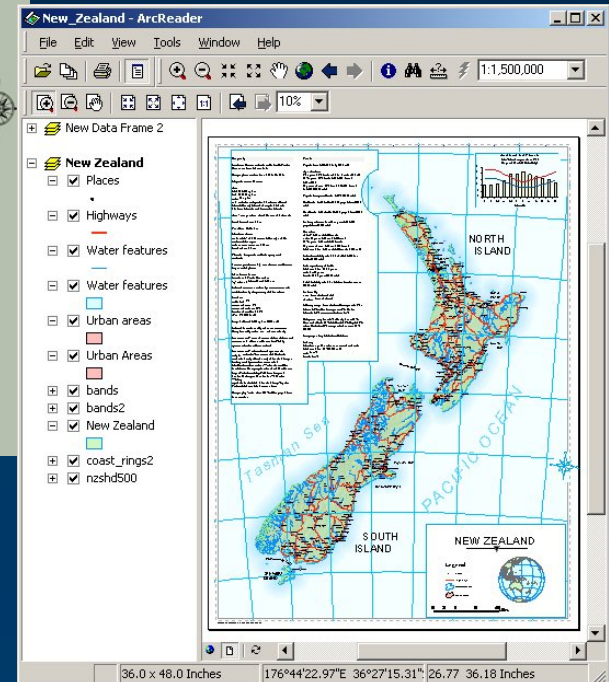
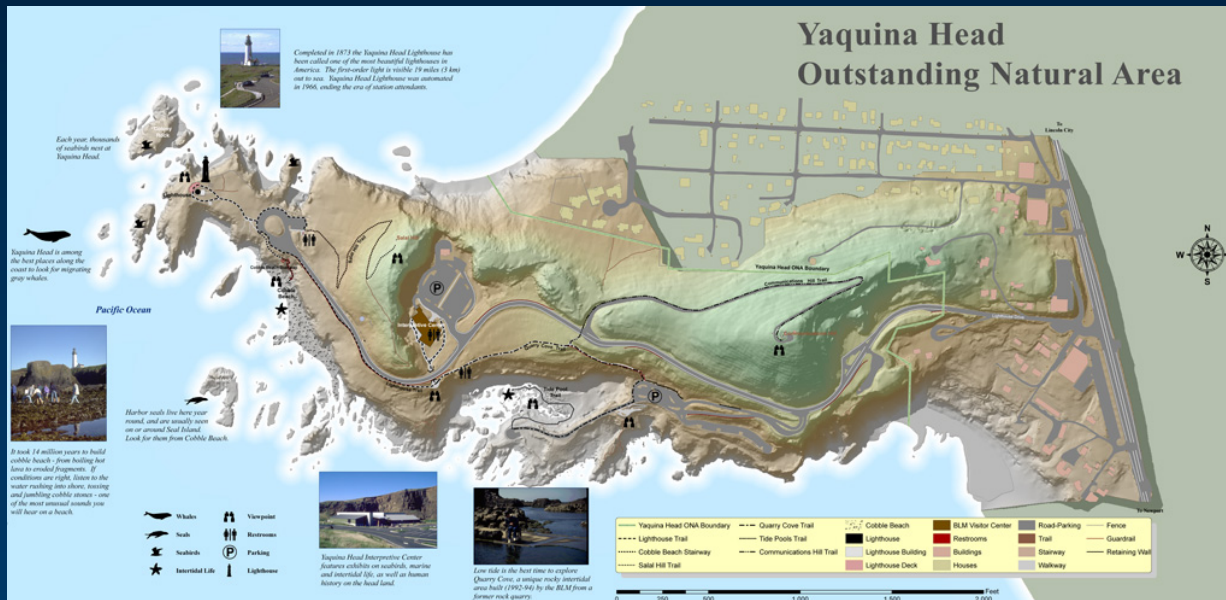
Data Distribution

- Distribute data on a local PC, or multiple PC's (LAN, WAN)
- Distribute over the Web for access anywhere



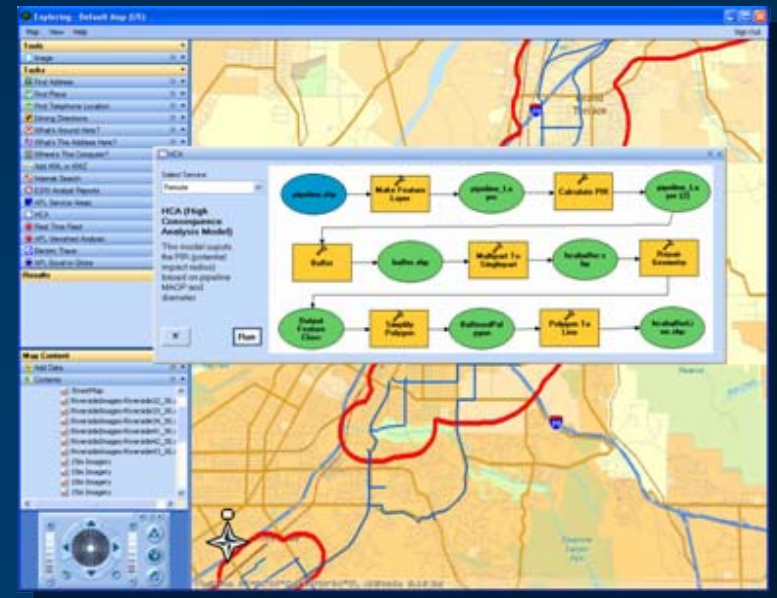
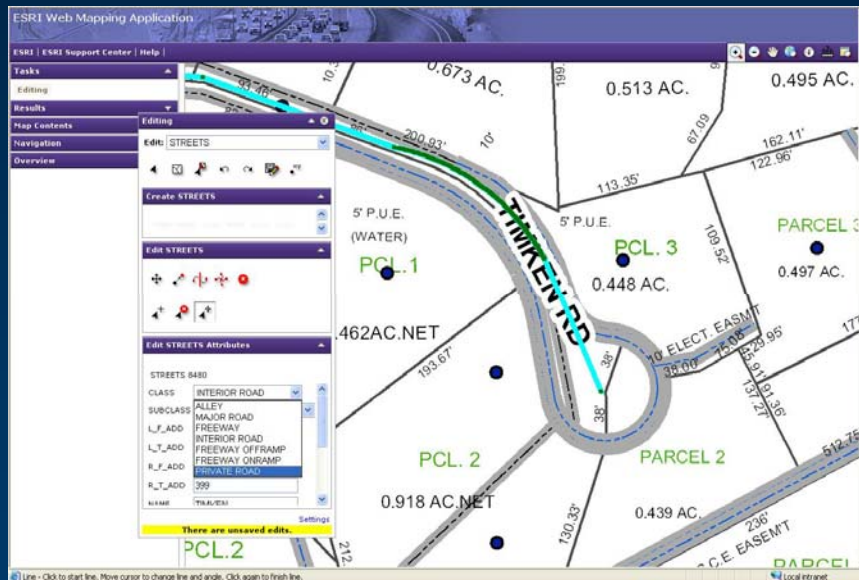
Output Functions

Geologic data can be printed and distributed using advanced cartographic techniques and standardized symbology



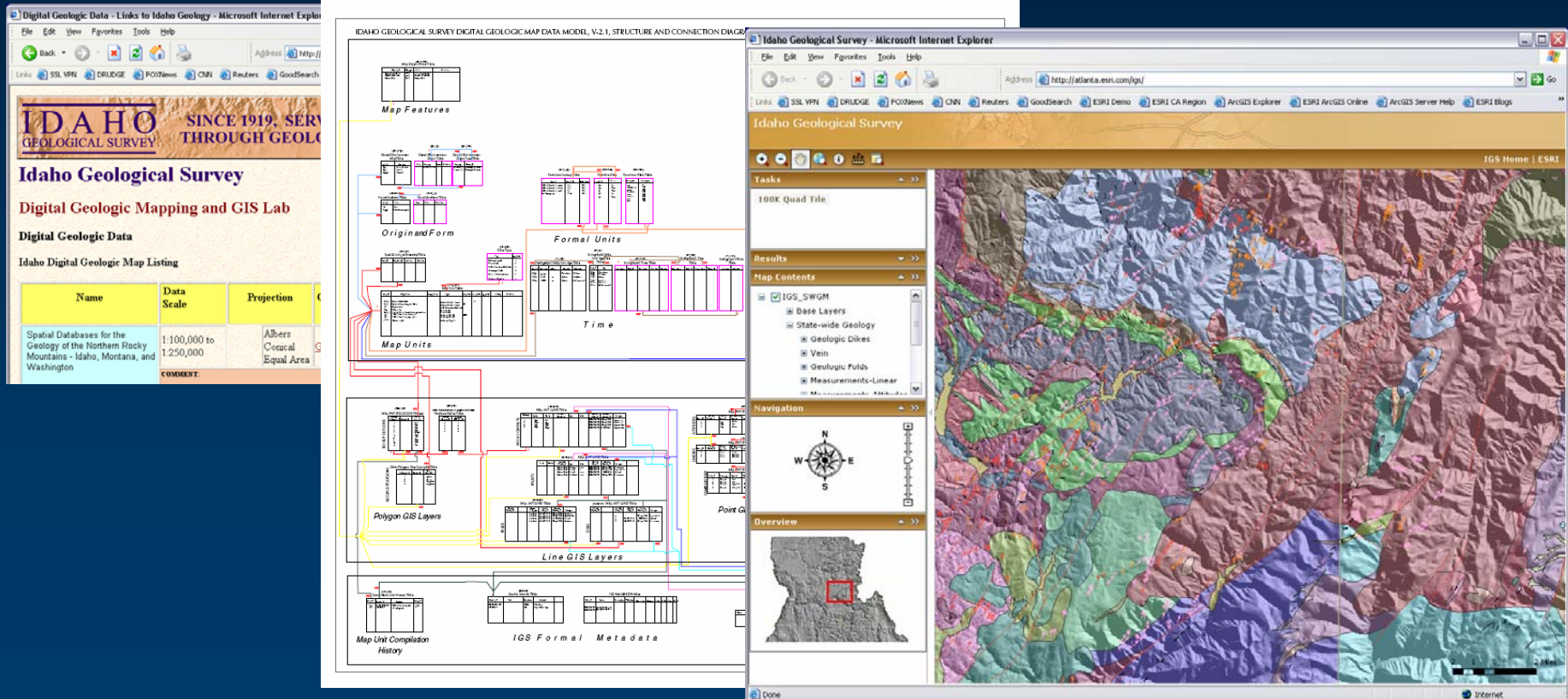
Server-based Management

Server-based spatial data provides the means to manage and distribute standardized data and analysis tools over networks and the Internet



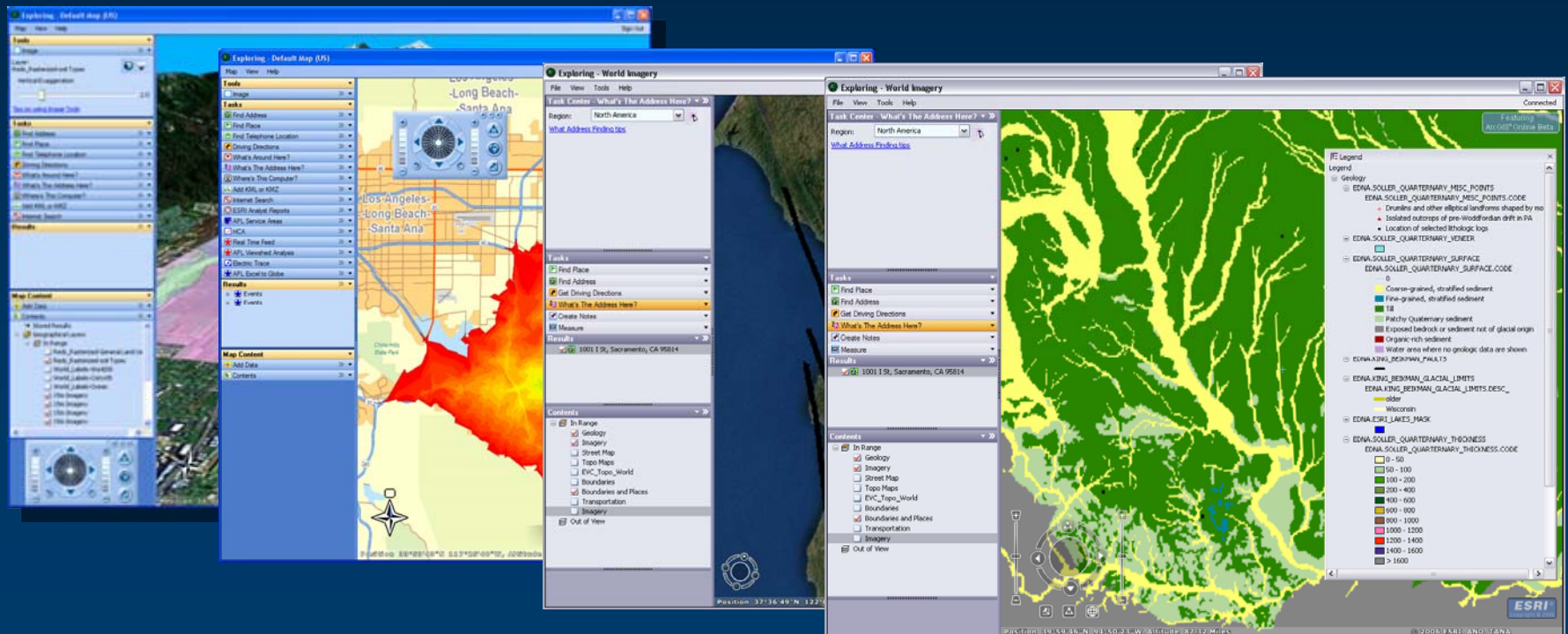
Data Modeling for Sharing, Consistency

Geologic map data models, e.g., the North American Geologic Data Model (NADM) provide consistent data structure and attributes

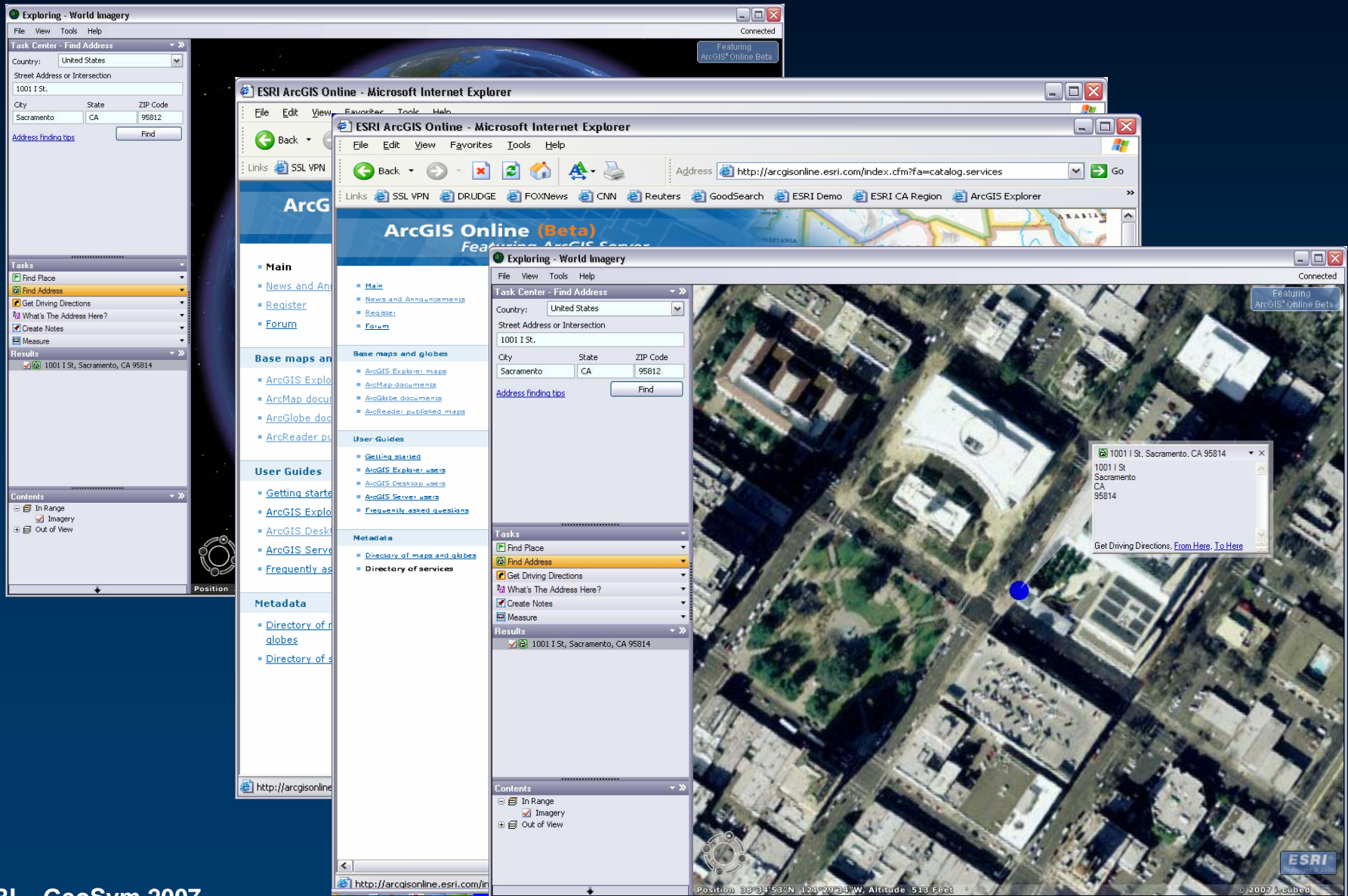


ArcGIS Explorer 9.2

- Lightweight and free desktop client
- 2-D and 3-D visualization and analysis
- Simple, powerful spatial functionality for non-technical endusers, managers, and industry leaders

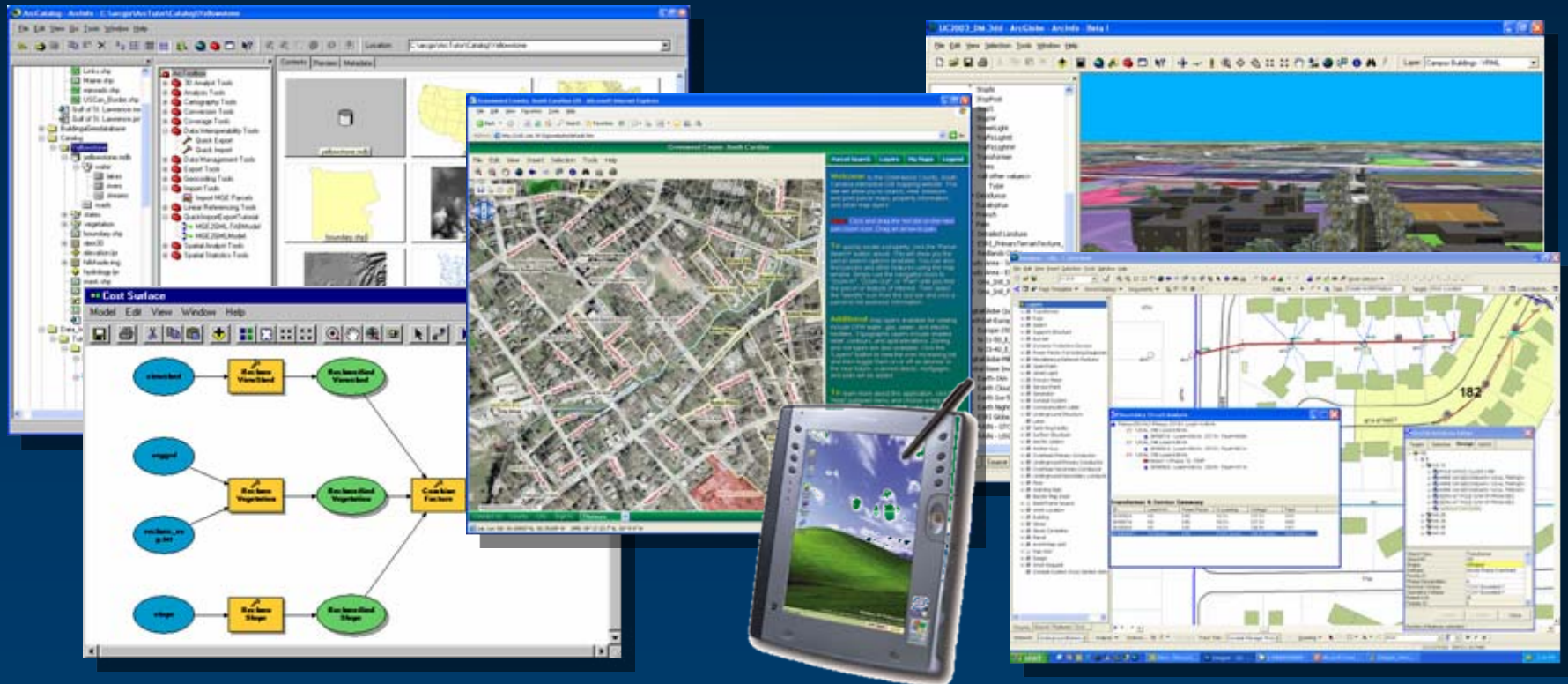


ArcGIS Explorer 9.2 <http://arcgisonline.esri.com/>



Summary Slide – ArcGIS

ArcGIS tools are designed to complete an enterprise system, allowing a wide variety of users access to consistent data wherever they work in the world



Thank You

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